READ THIS FIRST SunIPC 1.2

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Read This First

Software READ THIS FIRST
SunIPC 1.2

Introduction

SunIPC™ enables you to run PC applications under MS-DOS® in a window on a Sun Workstation™ screen. SunIPC 1.2 adds support for systems being upgraded to SunOS™ 4.0 and permits installation of SunIPC's into Sun-3™ and Sun-4™ systems.

Getting Help

If you have any problems installing or using SunIPC 1.2, call the Sun Microsystems Answer Center at: 1-800-USA-4SUN (1-800-872-4786). Have your system's model number, serial number, *product name* release number (for software), and Sun operating system (SunOS) release number ready to give to the dispatcher.

You can also send questions by electronic mail to `sun!hotline`. Be sure to include your name, company, and phone number, along with the information above.

If you have questions about Sun's support services or your shipment, call your sales representative.

- To see the SunOS release number, type: **`cat /etc/motd`**

SunOS 4.x Only

SunIPC 1.2 adds support for systems being upgraded to SunOS 4.0 or later. SunIPC 1.2 does not run under SunOS 3.*x*. The SunIPC 1.1 release is retained for SunOS 3.*x* users.

SunOS 4.0.1 Recommended

The 4.0.1 release contains two bug fixes that we recommend installing if you are going to run SunIPC. The two patches are **`ipc`** and (if you are running with a 4100 cpu board) **`bus4_110`**.

SMD-4 Disk Controller

There is a known bug when running SunIPC and the SMD-4 disk controller (Xylogics 7053). The bug is a kernel bug (#1015326), and causes your system to lock up (user processes do not run, but you can `ping` your system from another machine). The bug only happens under extreme system loads. We do not recommend this configuration. However, if you need this configuration, contact your Sun Answer Center referencing bug ID #1015326.

A work around is to boot your system under `kadb` (instead of directly into `vmunix`). If your system locks up, type **`L1-A`** (or **`BREAK`** if you have a serial terminal for a console) to enter `kadb`. Type **`$c`** **`<CR>`** (this gives a stack back-trace), **`:c`** **`<CR>`** (this exits the debugger). Your system should now be running again.

Upgrades from SunIPC 1.1

The installation scripts do not remove any existing files when they perform an installation. This makes it easy to add new options to your configuration, or to customize a few files and then install the rest.

If you have an old SunIPC installation, you should either move or remove the following files and directories before proceeding with your SunIPC 1.2 installation:

```
/usr/pctool
/usr/bin/pctool
/usr/bin/psfx80
/usr/bin/dos2unix
/usr/bin/unix2dos
```

Appendix B of the *SunIPC 1.2 Release Manual* lists all the files that SunIPC 1.2 adds or changes. If, during your first SunIPC installation, you see a message specifying that a file or directory "already exists," this could cause a problem. You should let the installation finish, move or remove the file or directory indicated, and rerun the installation script.

Disk Space

The installation scripts check to be sure that you have enough space to create the shared data directory. However, they do not check for space for `/var/pctool`, `/usr/pctool`, or for space to build a new kernel. You must do this yourself before running `ipc_configure`. If insufficient disk space is available, `ipc_configure` will fail.

Installing on a Remote Disk

To avoid encountering file permission problems, you must be root on your system when running the installation script. Root does not typically have superuser priviledges when accessing partitions that are remotely mounted, however. This means that the installation scripts cannot create files in remote destination directories.

There are two ways to handle this problem:

- Log in to the machine that contains the disks on which you will be performing the installation. Read in the tape (`extract_unbundled`) on that machine, then complete the rest of the installation (`ipc_configure`) on your own machine.
- Set up the remote machine to give yourself remote superuser access. For detailed information on how to do this, see the `exportfs`(8) and `exports`(5) Man Pages. Basically, you run the following on the remote machine:

  ```
  remote-machine# exportfs -o root=my-host-name /dest-partition
  ```

  where `my-host-name` is the name of your machine that requires root access, and `dest-partition` is the base of the exported partition.

Diskless Clients with SunIPC Boards

Diskless clients typically mount the `/usr` directory with read permission only and, therefore, cannot create a directory under `/usr`. If this is the case on your system, you should install SunIPC 1.2 on the fileserver, even if the fileserver has no SunIPC board installed. When you are asked, "Would you like to configure the IPC software?", answer **no**. After you install the SunIPC software on the fileserver, you should run `ipc_configure` on your system.

Instead of installing the software on the fileserver, you could change the installation path of the main directory, that procedure is more complex. For details, see *Changing Default Installation Directories*.

File Organization

SunIPC 1.2 software is divided into three parts:

- Software that never changes and is *architecture-independent* (called the shared data directory, by default `/usr/share/pctool`).
- Software that never changes but is *architecture-dependent* (the main directory, by default `/usr/pctool`). This directory contains only symbolic links to the shared and variable data directories.
- Software that changes regularly (called the variable data directory, by default `/var/pctool`).

This division was used to provide compatibility with the new SunOS 4.0 file organization, and especially with the "read only `/usr` partition" concept. It also allows you to have a single shared directory containing all distribution files. This directory may be mounted by any client node. All architecture-specific setup is done in the main directory.

The only pathname coded into the `pctool` program is `/usr/pctool`, which corresponds to the main directory. To override this directory, set the PCTOOLDIR environment variable to the actual location of the main directory.

The configuration script `ipc_configure` supports two other environment variables: PCTOOLVAR and PCTOOLSHARE. These correspond to the pathnames for the variable and shared data directories, respectively.

This separation of data files by types of access is entirely optional. For simplicity, you can store all files in `/usr/pctool`, if you desire. To do so, simply set all three directory names to `/usr/pctool`; the `ipc_configure` script will perform the proper configuration.

Changing Default Installation Directories

Of the three directories, two (the shared data directory and the variable data directory) may be moved easily by specifying the correct pathnames to the installation scripts. The main directory is accessed elsewhere, however, and if you move it, you must update the files which reference it. If you use a path other than `/usr/pctool`, you must either link `/usr/pctool` to the main data directory, or do the following:

1. Set the `PCTOOLDIR` environment variable to the pathname of the main directory.
2. Change the `extend n:\usr\pctool` line in `autoexec.bat`.
3. Change any lines in the `config.pc`*X* file that refer to `/usr/pctool`.

The Redirector, PC-NFS, and the Automount Daemon

The redirector, a new feature of SunIPC 1.2, allows access to any file in the host Sun's directory structure. It cannot access any file that the host Sun does not have access to, however.

This poses a problem if you are a remote SunIPC client. You want access to your files, but they may not be accessible to the SunIPC host system. In this case, you have three alternatives:

- You can make sure that the host system has access to the files you want. This approach is probably the best for small, simple installations because it is the least complex.
- You can install PC-NFS™. PC-NFS allows you to access any file on the network. You specify both the machine name and the pathname of the file system you want:

  ```
  net use N: \\HOSTNAME\pathname
  ```

  If you use PC-NFS, you do not need to be concerned about which file systems are available on the server.

- You can enable the automount daemon. The automount daemon maps the entire NFS™ network into paths of `/net/HOSTNAME/pathname`. It is analogous to PC-NFS: Any file that you can access through PC-NFS you can also access through the automount daemon.

  Use the `extend` command to map these automounted pathnames:

  ```
  extend z:\net\HOSTNAME\pathname
  ```

  Using the automount daemon provides other advantages. You have the benefits of the automounter available to the host Sun as well. In addition, using `extend` provides faster file access than using PC-NFS, is easier to install, and consumes less of the SunIPC's 640k of base memory.

Any one of these alternatives should provide a functional, remotely accessible SunIPC system.

The 80287 Jumper

The 80287 coprocessor is an optional component of SunIPC 1.2. If you decide to add (or remove) the 80287 after installing the SunIPC board, you must change the jumper at location H10. The jumper should be *installed* if there is no 80287 on the board. If you add an 80287 later, the jumper at H10 should be *removed*.

New Commands

SunIPC 1.2 provides supports for several new commands not supported in Release 1.1. Some of these commands control MS-DOS functions, others handle file transfers between the UNIX® and MS-DOS file systems. Sources for information on these commands are listed below.

- `device=pemm.sys`

  SunIPC 1.2 User's Guide, Chapter 1

  SunIPC 1.2 Release Manual, Chapter 7

  Sun MS-DOS Reference Manual, Section 3.6

- `dospath`

  SunIPC 1.2 Release Manual, Chapter 7

- `dos2unix`

  SunIPC 1.2 Release Manual, Chapter 7

  Sun MS-DOS Reference Manual, Section 1.20

  PC-NFS User's Manual, Chapters 2, 3, and 8

- `extend`

  Sun MS-DOS Reference Manual, Section 1.24

  SunIPC 1.2 User's Guide, Chapter 6

- `flush1`

  SunIPC 1.2 Release Manual, Chapter 7

- `flush3`

  SunIPC 1.2 Release Manual, Chapter 7

- `pctool`

  SunIPC 1.2 User's Guide, Chapters 2 and 8

- `psfx80`

  SunIPC 1.2 User's Guide, Chapter 5

- `quit`

  SunIPC 1.2 Release Manual, Chapter 7

  Sun MS-DOS Reference Manual, Section 1.39

- `redir`

  Sun MS-DOS Reference Manual, Section 1.41

  SunIPC 1.2 User's Guide, Chapter 6

- `setup`

  SunIPC 1.2 Release Manual, Chapter 7

- `unixpath`

  SunIPC 1.2 Release Manual, Chapter 7

- `unix2dos`

  SunIPC 1.2 Release Manual, Chapter 7

  Sun MS-DOS Reference Manual, Section 1.57

  PC-NFS User's Manual, Chapters 2, 3, and 8

- `xdir`

  SunIPC 1.2 Release Manual, Chapter 7

Addenda to *SunIPC 1.2 Release Manual*

On page 37 of the *SunIPC 1.2 Release Manual*, section 5.1, step 1, delete the line that reads:

```
# cd /usr/share/pctool
```

On page 38, step 2b, the *BS* parameter should be **20** for `mt` tape drives, and **126** for `ar` or `st` tape drives.

On page 42 of section 5.2 of the *SunIPC 1.2 Release Manual*, some of the pathnames should have been `/usr/share/pctool`. The box at the top of the page, which shows the commands for copying the files, should appear as follows:

```
# mkdir /usr/pctool /usr/pctool/files

# cd /usr/bin
# rcp REMOTE:/usr/share/pctool/ARCH/bin/pctool .
# rcp REMOTE:/usr/share/pctool/ARCH/bin/psfx80 .
```

```
# rcp REMOTE:/usr/share/pctool/ARCH/bin/dos2unix
# rcp REMOTE:/usr/share/pctool/ARCH/bin/unix2dos

# cd /usr/pctool
# rcp REMOTE:/usr/share/pctool/pcfont.r.14 .
# rcp REMOTE:/usr/share/pctool/pcfont.b.14 .
# rcp REMOTE:/usr/share/pctool/files/psfx80.pro files
```

Known Limitations

The following limitations are known to exist in the SunIPC 1.2 software:

- The SunView™ `-i` inverse video option is not supported.
- If you change the size of a SunView font, the SunIPC window sizes incorrectly. You must resize the window manually to view the entire emulated MS-DOS display.
- When using the `Copy` and `Paste` functions in 80-column mode with CGA emulation, selected areas may not highlight properly. The areas are actually selected, but there is no visible highlighting to confirm the selection.
- Running the Lotus 1-2-3 hard disk installation utility may cause the SunIPC window to freeze or to respond sluggishly after the installation is complete. To correct this problem, quit the SunIPC window and restart `pct`.
- If you install Lotus 1-2-3 with two screens, the blank color screen displays first. To view the spreadsheet on the monochrome screen, pop up the SunIPC menu and choose `Show Screen`. When the submenu appears, choose either `hercules` or `monochrome`.
- Int 13 (disk interface) BIOS calls do not always return the correct return value when they succeed. The specification calls for both the carry bit to be clear and AH to be zero. Currently the returned value of AH is non-deterministic.

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Preface

Purpose and Audience

The purpose of this manual is to enable system administrators, engineers, and field service personnel to install the hardware and software that constitute the Sun Integrated Personal Computer (SunIPC). Some of the installation diagnostic information in this manual is also helpful for troubleshooting the SunIPC board after installation. New features and enhancements specific to the SunIPC 1.2 release are also described. The reader should be familiar with Sun UNIX† and with installation procedures for the Sun Workstation.

Summary of Contents

Chapter 1 — *Introduction* — Presents an overview of SunIPC1.2. This chapter summarizes the hardware and software features and the diagnostics that are provided. Chapter 1 also contains recommendations and guidelines you should consider before installing SunIPC software.

Chapter 2 — *Installing SunIPC Hardware* — Describes how to install a SunIPC board in a Sun-3/110, Sun-3/150, Sun-3/160, Sun-3/180, Sun-3/260, Sun-3/280, Sun-4/110, Sun-4/150, Sun-4/260, or Sun-4/280 system. This chapter also tells you how to connect the optional SunIPC floppy disk subsystem to a SunIPC board.

Chapter 3 — *Software Installation Terms and Concepts* — Discusses terminology and provides background information that you should be familiar with before installing the SunIPC software.

Chapter 4 — *Installing SunIPC Software Automatically* — Provides instructions for loading the software and running the `ipc_configure` script. The script automatically configures your kernel to support a SunIPC board. This is the simplest, and recommended, procedure for installing SunIPC 1.2 software. Chapter 4 also describes how to run the Diagnostic Test.

Chapter 5 — *Installing SunIPC Software Manually* — Describes the steps involved in doing a manual configuration if you choose not to configure automatically. This chapter provides detailed information for more experienced users.

Chapter 6 — *Features of the SunIPC 1.2 Release* — Describes the new features and enhancements available with the 1.2 release.

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Chapter 7 — *Addenda* — Provides additional documentation for MS-DOS commands newly supported in the SunIPC 1.2 release.

Appendix A — *SunIPC Installation Transcript* — Provides a "walk-through" of the SunIPC 1.2 software installation and automatic configuration.

Appendix B — *SunIPC Installation Files* — Lists files that the SunIPC installation procedures change or add.

Appendix C — *Using the PC-NFS 1.1 Configuration* — Describes the differences in the ways PC-NFS is configured under SunIPC 1.1 and SunIPC 1.2.

Appendix D — *Contents of the SunIPC Tape* — Lists the contents of the SunIPC 1.2 software distribution tape.

Companion Documents

Sun Manuals:

- *System Administration for the Sun Workstation* (800-1323-02)
- *Hardware Installation Manual* for your particular Sun system
- *Installing UNIX on the Sun Workstation* (800-1521-01)

SunIPC Documentation Set:

- *SunIPC 1.2 Read This First* (800-3111-10)
- *SunIPC 1.2 User's Guide* (800-3211-10)
- *PC-NFS User's Manual* (PC-NFS-09)
- *Sun MS-DOS Reference Manual* (814-1008-10)
- *Sun GWBASIC User's Manual* (814-1004-10)

Conventions

Throughout this manual, the prompts at which you type are represented by these symbols:

UNIX superuser shell prompt
% UNIX normal user shell prompt
> MS-DOS prompt from within `pctool`

`Boldface typewriter font` indicates commands that you should type exactly as printed on the page of this manual.

`Regular typewriter font` represents what the system displays on your screen. Regular typewriter font is also used to specify Sun system command names (program names) and to illustrate source code listings.

Italics indicate general arguments or parameters that you should replace with a specific word or string. Italics are also used to emphasize important terms.

Abbreviations

IPC — Integrated Personal Computer

NFS — Network File System

YP — Yellow Pages

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Introduction

This chapter contains three main sections:

- *Product Overview* — Presents a summary of the hardware and software features of SunIPC and of the SunIPC Diagnostic Test.
- *Installation Overview* — Presents a summary of the procedures for installing SunIPC hardware and software.
- *Before You Install SunIPC Software...* — Contains recommendations and guidelines you should consider before performing the installation procedure.

1.1. Product Overview

The Sun Integrated Personal Computer (SunIPC 1.2) is a coprocessor board and software product for VME-based Sun systems that lets you run application software under MS-DOS in a Sun window. SunIPC gives you access to the full range of software available for IBM PC, PC/XT, PC/AT, and compatible computers.

SunOS 4.x Only

SunIPC 1.2 adds support for systems being upgraded to SunOS 4.0 and permits installation of SunIPCs into Sun-4 systems. SunIPC 1.2 does not make SunIPC 1.1 obsolete, however. That release is retained for SunOS 3.*x* users. SunIPC 1.2 does not run on SunOS 3.*x*. SunIPC 1.2 is functionally compatible with SunIPC 1.1 but contains significant enhancements, including *cut and paste* functionality and fast, efficient access to UNIX† filesystems through the *file redirector*.

SunIPC hardware consists of a processor board and an optional floppy disk subsystem. The processor board includes an Intel/AMD 80286 processor and 1 Mbyte of memory (640 Kbytes usable by PC application software).

The Sun system in which the SunIPC boards reside is called the *host system*. As described in Chapter 3, you must install a SunIPC board and the corresponding software on each host system.

Other Sun systems can access SunIPC boards remotely. Such systems are called *client systems*. As described in Chapter 4, you must install SunIPC client

† UNIX is a registered trademark of AT&T.

software on each client system.

You can install as many as four SunIPC boards in a single Sun system if the slots are available. This system can be a Sun-3/110, Sun-3/160, Sun-3/180, Sun-3/260, Sun-3/280, Sun-4/110, Sun-4/260, or Sun-4/280. Although SunIPC 1.2 does not support Sun-2 systems as a host system, those systems can run SunIPC 1.2 as remote clients.

Terminology

In this manual, the following terms are used in describing the SunIPC system:

- *SunIPC host* — The Sun system in which the SunIPC board is installed.
- *SunIPC client* — A system which has remote access only with no SunIPC board installed. Access to SunIPC 1.2 is provided through the `pctool` program.
- *SunIPC server* — A system with a SunIPC board installed that does permit remote access.
- *SunIPC fileserver* — The system where the SunIPC software is installed. This is the location of `/usr/share/pctool`.

Hardware

SunIPC hardware includes the following:

- 1 10 MHz 80286 CPU
- 1 Mbyte of RAM (640 Kbytes usable by PC application software)
- 1 parallel port
- 2 emulated serial ports by way of the host system (maximum 2400 bps)
- 2 emulated parallel ports by way of the host system
- Emulated IBM PC/AT keyboard
- Emulated Microsoft bus mouse
- Emulated logical hard disks (as many as two)
- Optional 1.2 Mbyte and 360 Kbyte floppy disk drives
- NEC 765 floppy-disk controller (IBM-compatible)
- Optional 8 MHz Intel 80287 math coprocessor

Operating Environment

operating temperature	0 to 40 degrees Centigrade
nonoperating temperature	-20 to +65 degrees Centigrade
operating humidity	20% to 80% (non-condensing)
operating altitude	0 to 2,143 m (7000 ft.)
nonoperating altitude	0 to 12,192 m (40,000 ft.)

Power Requirements

+5 volts +/- 5% at 6 amps nominal

Software

SunIPC software includes the following features:

- MS-DOS 3.3 plus extensions.
- Microsoft's GWBASIC 3.22 plus extensions (equivalent to IBM's BASICA).
- File redirector which enables fast access to the UNIX file system.
- Support for LOTUS/INTEL/MICROSOFT (LIM 3.2) memory expansion standard.
- Choice of 3 display adaptors:
  - IBM monochrome adaptor — 80 x 25 characters (text only)
  - Hercules monochrome graphics adaptor — 720 x 350 pixels
  - IBM color graphics adaptor — 640 x 200 pixels
- Application-transparent conversion of text output for Epson FX-80/100 printers to Sun LaserWriter laser printers.
- Network File System (NFS) file access. NFS file access makes it possible to exchange files between SunIPC and the Sun file system and to use applications based on the PC-NFS toolkit.

Diagnostic Test

The SunIPC Diagnostic Test runs automatically under UNIX. This test verifies that you have correctly installed SunIPC hardware and that the hardware is operating properly. The SunIPC Diagnostic Test does *not* check SunIPC software.

The Diagnostic Test checks the following SunIPC hardware features:

- VME slave interface to host system
- Memory (RAM)
- 80286 microprocessor
- 80287 math coprocessor (if installed)
- Parallel port (if loopback plug is used)
- Portb - speaker control
- 8254 timer
- 8259 interrupt controller
- 8237 DMA controller
- Video support hardware
- Emulated I/O support hardware

- 765 floppy controller (if installed)

1.2. Installation Overview

The remaining sections in this chapter outline the steps you must follow to install SunIPC hardware and software and run the Diagnostic Test. Each of these steps is fully described later in the manual.

Installing SunIPC Hardware

Installing SunIPC hardware consists of the following:

1. Setting the VME address switch on the SunIPC board.
2. Inserting the SunIPC board in the backplane of the host system.
3. Setting the jumpers on the backplane of the host system.
4. Connecting the SunIPC optional floppy disk subsystem.

You must complete the first two steps. You may need to complete the second two steps, depending on where you insert the SunIPC board and whether you plan to use floppy disks. Chapter 2 tells you how to perform all four steps.

About the Diagnostic Test

The SunIPC Diagnostic Test — a program called `ipc.diag` — tests whether you have correctly installed SunIPC hardware. Before you can run the Diagnostic Test, you must load the program (and the rest of SunIPC software) from tape.

Installing SunIPC Software

Installing SunIPC software consists of three main steps:

1. Loading the contents of the SunIPC software tape onto the SunIPC fileserver.
2. Configuring the system which contains the SunIPC board.
3. Configuring any systems which do not have a board but which do require remote access.

Step 1 is always performed. It is necessary for access to the SunIPC files, whether the board using them has local or remote access.

Step 2 is always performed. It tailors SunIPC to the needs of a local user. This can both be done automatically by running the configuration program, `ipc_configure`. This process is described in Chapter 4. If you have a non-standard configuration and choose not to run the configuration program, you may also perform these steps manually. The manual configuration process is described in Chapter 5.

Step 3 is performed when systems without a SunIPC board installed want remote access. The SunIPC host then acts as the SunIPC remote server to these systems. This step can only be done manually (see Section 5.2 for more details).

1.3. Before You Install SunIPC Software...

This section contains important information that you should read *before* running the `/usr/etc/extract_unbundled` script to read the SunIPC software from the tape onto your system.

Read the Release Notes

Before you begin to load the software from the tape, read the documentation labelled *READ THIS FIRST* that accompanied your SunIPC release media.

If You Are Doing an Upgrade

If you are doing an upgrade, you should be aware that the automatic installation script (`ipc_configure`) does not remove existing copies of the software. This has been done so that you may safely rerun the installation scripts after customizing your software. If you have existing SunIPC software on your system, you should move it before installing this release.

About the SunIPC Logical Hard Disks

SunIPC 1.2 allows access to as many as two logical hard disks with a default maximum size of 20 Mbytes. To avoid resizing these disks, you should store application programs and data on a UNIX file system. You can access these files easily by using the file redirector or PC-NFS.

There are several advantages to this approach, particularly if you are using remote access in your Sun system.

- Where license agreements permit it, you can store PC applications and data in public directories that any SunIPC board can access. This allows easy sharing of programs, data, and tools within the SunIPC and PC-NFS user community.
- Since any SunIPC board can access files on a network disk, you are not restricted to the use of a particular SunIPC board.
- Backups and restores can be performed on a file, rather than only a disk, basis.
- Using NFS (in conjunction with the Yellow Pages service) provides the username/password security mechanism to protect the files stored in your UNIX directory tree.

Complete details on the file redirector are included in Chapter 6 of the *SunIPC 1.2 User's Guide*. For more information about using SunIPC with NFS file access, see the manual *PC-NFS*. For information about achieving SunIPC board independence by creating a board-independent `autoexec.bat` file, see Chapter 4 of the *SunIPC 1.2 User's Guide*.

Default Directory for the Logical Hard Disks

As previously mentioned, as many as two logical hard disk files are associated with each SunIPC board. Because these files can grow to be very large, it is important to consider where you want to install a logical hard disk for each SunIPC board. The default directory for the logical hard disk is `/var/pctool`.

CAUTION **Do not allow multiple SunIPC boards to access the same logical hard disk. If you do, the contents of the logical hard disk will be corrupted.**

You can now go on to install SunIPC hardware as described in Chapter 2.

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Installing SunIPC Hardware

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2

Installing SunIPC Hardware

This chapter describes how to install a SunIPC board in a Sun-3/110, Sun-3/150, Sun-3/160, Sun-3/180, Sun-3/260, Sun-3/280, Sun-4/110, Sun-4/150, Sun-4/260, or Sun-4/280 system. The process includes the following steps:

1. Setting the VME address switch on the SunIPC board.
2. Inserting the SunIPC board in the backplane of the host system.
3. Setting the jumpers on the backplane of the host system. (As described in Section 2.3 , this step is not always necessary.)

When unpacking the new SunIPC board, take care not to bend the stake pins.

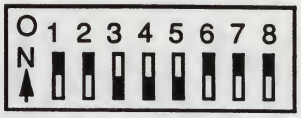
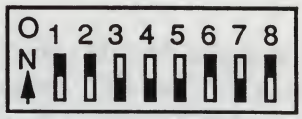
2.1. Setting the VME Address Switch

Before installing a new SunIPC board, you must verify that the board's VME address switch is set correctly.

If you are installing a single SunIPC board, its *device name* is `pc0`. If you are installing more than one board, the second board is `pc1`, the third is `pc2`, and the fourth is `pc3`. Each of these device names corresponds to a different VME address. You must set the VME address switch on each SunIPC board accordingly by hand.

Table 2-1 lists the switch settings for each of the four SunIPC boards installed in a single host system.

Table 2-1 *SunIPC VME Address Settings*

VME Address	Switch Setting	UNIX Device Number
380000		/dev/pc0
3A0000		/dev/pc1
3C0000		/dev/pc2
3E0000		/dev/pc3

To set the VME address switches, determine which side of the switch is the ON position. In the diagrams, the darkened half of the dipswitch indicates the half which is pushed down.

2.2. Installing the SunIPC Board

You can now install the new SunIPC board in the *backplane* of the host system. This system can be a Sun-3/110, Sun-3/150, Sun-3/160, Sun-3/180, Sun-3/260, Sun-3/280, Sun-4/110, Sun-4/150, Sun-4/260 or Sun-4/280. Before installation you should do the following:

1. Halt the UNIX system if necessary.
2. Turn off the power to the processor.
3. Disconnect the power cord.
4. Disconnect all peripheral devices that are plugged into the rear panel of the host system.

To install a new SunIPC board, follow these steps:

1. Determine the slot in the Sun system's backplane that will hold the new SunIPC board. You can install the board in one of the backplane slots 7–12

on a Sun-3/160, Sun-3/180, Sun-3/260, Sun-3/280, or Sun-4/280 (slots 2 or 3 on a Sun-3/110 or Sun-4/110). Backplane slots are numbered from left to right, as viewed from the rear of the pedestal.

Although you can install a SunIPC board in any unoccupied slot, it is recommended that you use the rightmost slot. If you cannot install the board in this location, *or* you are installing multiple SunIPC boards, you must reconfigure the jumpers on the Sun system's backplane. For more information about reconfiguring the jumpers, see Section 2.3, "Setting the Jumpers."

Note that blank slots on the VME backplane require special jumpering as noted in the appropriate *Hardware Installation Manual.*

On a Sun-3/110 or Sun-4/110, refer to the *Sun Microsystems Configuration Guide* to determine the appropriate slot in which to install the SunIPC board.

2. Use an Allen wrench to remove the rear panel plate that covers the desired slot.
3. Remove the Filler Plate (if present) from the unoccupied slot you plan to use.
4. Align the SunIPC board in the desired backplane slot, with its components facing to the right. (On a Sun-3/110, the components should be facing up.) Slide the board into the slot until you meet with resistance. Then carefully apply pressure until the SunIPC board mates with the backplane connector. Do not apply too much pressure; if you have difficulty with this step, realign the board and try again.
5. Secure the SunIPC board with the Allen screws.

2.3. Setting the Jumpers

Read this section only if you are *not* installing the SunIPC board in the recommended slot on the host system's backplane.

If you are installing the board in a Sun-3/110 or Sun-4/110, refer to the *Hardware Installation* manual for your system. After removing any Interrupt Acknowledge (IACK) jumpers, skip to section 2.5, "Testing the Hardware."

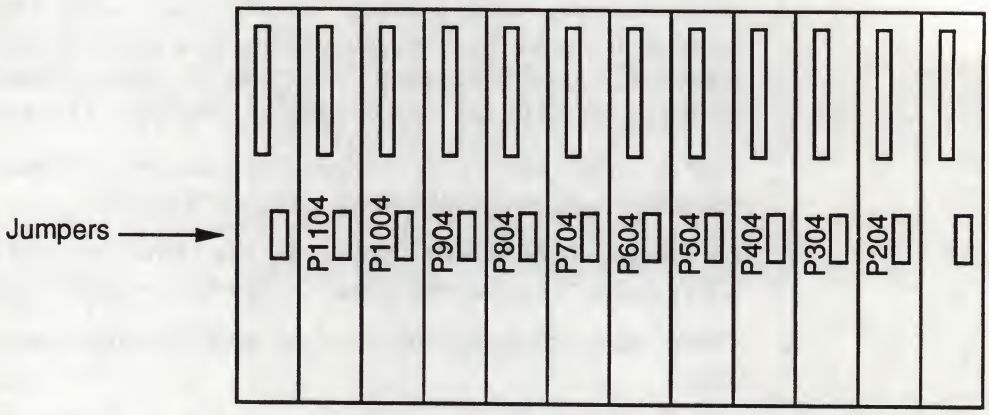
Note: If you do not set the jumpers as described in this section, the host system will hang when you try to access the newly-installed SunIPC board.

To set the jumpers on a Sun-3/160, Sun-3/260, or Sun-4/260, follow these steps:

1. Remove the outer front panel of the host system's pedestal with a gentle pull. Use a Phillips screwdriver to remove the four screws on the panel that support the power supply.
2. Pry the panel loose (there are holes in the sides to make this easier) and swing it out from the top to expose the jumpers.

   Figure 2-1 illustrates the jumper locations for each slot at the rear of a Sun system's pedestal. Note that the slots are numbered 1–12, from left to right. Also note that there are no jumpers from slot 1 to slot 2, nor from slot 11 to slot 12.

Figure 2-1 *Jumper Locations*



Note: To set the jumpers on a Sun-3/180, Sun-3/280, or Sun-4/280, first remove the front bezel plate to expose the configuration jumpers.

Jumper numbers are printed to the left of each jumper. In the Sun-3 and Sun-4 the jumpers are numbered from P204 through P1104.

3. If you do not follow the recommended placement for the new board on a Sun-3 or Sun-4, remove the jumper in each backplane which corresponds to a slot where you plan to install a SunIPC board. For example, if you have installed a board in backplane slot 7, remove jumper number P704.
4. After removing the jumper(s), replace the power supply panel and the outer panel.
5. Reconnect all peripheral devices, connect the power cord, and turn on the power.

You have finished installing the SunIPC hardware.

2.4. Connecting the Floppy Disk Subsystem

This section describes how to connect the optional floppy disk subsystem to the backpanel of a SunIPC board.

CAUTION **Before you attempt to connect the floppy disk subsystem, make certain that the OFF/ON switch at the front of the host system is OFF (the side with the "0" pushed in) and that the AC power cord is unplugged from the rear of the host system. In addition, you must switch off and unplug the floppy disk subsystem itself.**

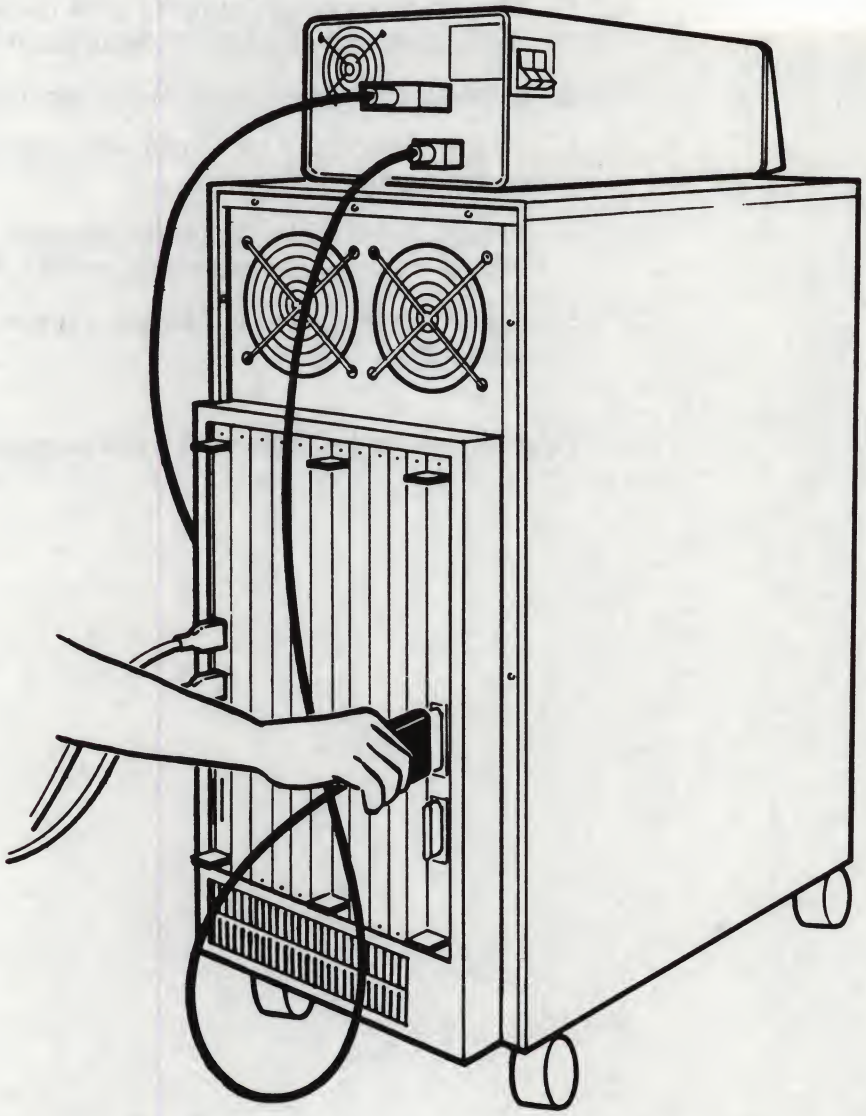
The floppy disk subsystem has two cables. One is the standard three-prong power cable. The other plugs into the DB-37 (the 37-pin connector labelled FLOPPY at the backpanel of the SunIPC board).

You can now attach the floppy disk subsystem to the SunIPC board as follows:

1. Plug the floppy disk subsystem's cable (the second cable) into the connector on the backpanel of the SunIPC board that is labelled FLOPPY.
2. Screw the cable to the jackscrews on the connector.
3. Plug the other end of the second cable into the floppy disk subsystem's connector and tighten the screws.
4. Plug the power cable (the three-prong cable) first into the receptacle at the back of the floppy disk subsystem and then into the AC outlet.
5. Set the power switches on both the host system and the floppy disk subsystem to ON.

Figure 2-2 shows the SunIPC floppy disk subsystem connected to a SunIPC board.

Figure 2-2 *Connecting the Floppy Disk Subsystem*



2.5. Testing the Hardware

The SunIPC Diagnostic Test verifes that you have correctly installed the new SunIPC board. Before running the test, you must first load the software from tape and configure your system to run SunIPC. The process of loading the software and configuring the system are described in Chapter 4.

3

Software Installation Terms and Concepts

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3

Software Installation Terms and Concepts

This chapter includes several terms which will be useful to know during the software installation process. Taking a few moments to understand these concepts will save you time later as you install the SunIPC software and configure your system.

3.1. Shared Data Directory

This directory holds all of the SunIPC files that do not change. It is architecture-independent and is never written to. By default, this directory is `/usr/share/pctool`. You may have a single copy of this directory tree that is shared among all SunIPC users and systems.

If you have access to a fileserver that already has the shared directory on line, you have the option of simply mounting the fileserver's shared directory. You do not need to read it in from tape. In that case, your installation consists of mounting the disk, and then running the `files/ipc_configure` program, located in the shared data directory that you just mounted.

If you do use the tape, the shared data directory is a direct image of the files on the release tape. It includes several required subdirectories and several optional ones. You will be prompted by the installation script for the subdirectories that are appropriate for your system:

- *sun2, sun3, sun4* — Architecture-specific directories that hold executables
- *nfs* — The PC-NFS directory
- *sysex* — The directory needed to run the `sysdiag` or `sundiag` system diagnostic program

The shared data directory requires a significant amount of disk space:

1.2 Mbytes for the base system, plus

610 Kbytes for the Sun-4 specific files,
510 Kbytes for the Sun-2 or Sun-3 files,
1515 Kbytes for the NFS software, and
110 Kbytes for the SYSEX package.

All these sizes are approximate; they may be different, depending upon the particular release of the software that you have. The total requirement described

above is nearly 4.5 Mbytes for a multi-architecture system with all the optional software.

3.2. Main Directory

This is the directory used by the `pctool` program (the program that you use to gain access to the SunIPC). The installation program creates and configures this directory for you. By default, this directory is `/usr/pctool`.

The main directory typically contains only symbolic links to the variable and shared data directories and requires little disk space (approximately 10 Kbytes).

CAUTION **If you are upgrading from a previous release of SunIPC, and your system still has the software installed, you should either remove the old software or move it to another name before installing SunIPC 1.2**

3.3. Variable Data Directory

This directory holds those files that need to be written to by the SunIPC software. It is the *only* directory in the SunIPC system that is changed regularly. It holds two small data files plus the image of your logical drive C.

When they are installed, these files occupy approximately 310 Kbytes of disk storage per SunIPC board. The drive C file can grow to 20 Mbytes, however. In addition, logical drives never shrink; once they have grown to a certain size, the only way to shrink them is to initialize a new drive from the existing one.

You should therefore make sure that the partition holding the variable data directory has an appropriate amount of free space. The default pathname for the variable data directory is `/var/pctool`.

For more information on logical hard disks and changing the size of drive C, see Chapter 4 of the *SunIPC 1.2 User's Guide*.

3.4. Remote Access

It is possible to use a SunIPC board that is not physically present on your system (see Chapter 2 of the *SunIPC 1.2 User's Guide* for more information). A system that permits users on other machines to access its SunIPC boards must have first enabled remote access. This system is called a SunIPC server.

3.5. PC-NFS

The PC Network File System package is a Sun software product that allows IBM PC-compatible machines access to Sun (and other NFS-compatible) files over the Ethernet network. The PC-NFS package included with the SunIPC is this same package with additional drivers to allow the SunIPC hardware to have this same file access. (See the *PC-NFS User's Manual* for more information.)

This PC-NFS package is not normally required for use with the SunIPC 1.2 release. Instead, the file redirector has been provided to gain access to the UNIX file system. The redirector provides access only to those files that are present in the host

Sun's file system, however. For details on using the file redirector, see Chapter 6 of the *SunIPC 1.2 User's Guide*.

You may want to install PC-NFS if some of the following conditions are true:

- You want to access file systems from the SunIPC that are not accessible by the host Sun.
- You allow remote access to the SunIPC. (The redirector accesses files that are on the Sun with the SunIPC board, not files that are on the remote, client Sun).
- You wish to use the PC-NFS remote printing services.
- You want to be compatible with the SunIPC 1.1 technique of accessing UNIX files.

3.6. Yellow Pages

The Yellow Pages (YP) is a network database which includes information on users and machines on the network. It also provides services for searching that database. The Yellow Pages is too vast to describe in detail here; see *Using the Network: Beginner's Guide*, *SunOS Reference Manual*, Section 5 ("File Formats") and Section 8 ("Maintenance Commands"), and *System and Network Administration* for detailed information on using and maintaining the Yellow Pages.

The SunIPC software may be installed on your machine, whether or not you are running the Yellow Pages. If you are not running the Yellow Pages, the installation scripts will configure your system (except for obtaining host IDs; you must do this by hand). If you are running the Yellow Pages, there are certain things that the install script cannot do; they must be done on the YP Master Server.

3.7. YP Master Server

Every Yellow Pages domain has a single master server. This server holds the human-readable data used to generate the YP databases. This is the only node on the network where changes to the YP database may be made. Three databases may need to be updated to complete the installation of SunIPC.

CAUTION **It is strongly recommended that you update these databases before beginning the installation.**

The databases to be changed, together with the changes and the required configurations:

- `hosts` — If you are running PC-NFS, each SunIPC board will require a host ID. This host ID should be on the same network as the Sun system that contains the SunIPC board. (This is a change from SunIPC 1.1. If you cannot obtain new host IDs, see Appendix C, *Using the SunIPC 1.1 PC-NFS Configuration*, for information on how to install the network using SunIPC 1.1 network conventions).

If you plan to install PC-NFS, obtain one host ID per SunIPC board from your network administrator. The hostname should consist of the name of your Sun machine, with `-ipcX` appended. For example, if the Sun machine name is `joe`, the hostnames of the SunIPC boards should be `joe-ipc0`, `joe-ipc1`, `joe-ipc2`, and `joe-ipc3`.

The software does not actually require this, but it will make the administration and debugging of the network much easier.

- `rpc` — The Remote Procedure Call database associates an identifier for each RPC service. If you are running PC-NFS, the PC-NFS authentication server will require an entry in this database.

  If you plan to install PC-NFS, your YP administrator must add the following line to the database:

  ```
  pcnfsd     150001
  ```

- `services` — The services database *publishes* the addresses of network services so that clients of a service can find the appropriate server. The SunIPC software must publish the service address of the remote access daemon.

  If you plan to allow remote access to a SunIPC board now or at any time in the future, on any node in your network, your YP administrator should add the following line to your `services` database:

  ```
  pcserver 600/tcp    # SunIPC remote access daemon
  ```

3.8. The `extract_unbundled` Program

SunOS 4.0 contains one common technique used to install all unbundled software. The `/usr/etc/extract_unbundled` program begins this process.

3.9. The `install_unbundled` Program

This program is read from the release tape, and is called by `extract_unbundled`. The `install_unbundled` program, in turn, calls the `1.2_IPC` program.

3.10. The `1.2_IPC` Program

`1.2_IPC` is one of the two main SunIPC installation programs. Its job is to read the remainder of the release tape into your system. You will be asked to specify the type of system you have and what optional software you want.

You need to understand the following terms when running this script:

- *Standalone system* — Only your node will be using your shared data directory. Only files specific to your system architecture will be read in.

- *Homogeneous server* — Other machines may share the data in your shared data directory, but they will all be of the same architecture as your machine.
- *Heterogeneous server* — Your machine may serve any architecture, the same as or different from its own. You will be prompted for which architectures should be installed.

`1.2_IPC` may be run again safely if you wish to install additional optional software or architectures, or to reinstall files that may have been accidentally damaged. The program is located in `/usr/tmp/unbundled/1.2_IPC`.

3.11. The `ipc_configure` Script

This script completes the installation process. It is located in the `files` subdirectory of the shared data directory (by default, `/usr/share/pctool/files/ipc_configure`).

`ipc_configure` also requires certain information to run:

- The locations of the shared, variable, and main directories
- Which SunIPC boards you wish to configure (`0`, `1`, `2`, `3`, `ALL`, or `NONE`)
- Whether or not you want PC-NFS configured on your system
- Whether or not you want the remote access server enabled for your system
- Whether or not you want a new UNIX kernel configured for your system

3.12. Client-only Node

A system which accesses a SunIPC board remotely without having its own board installed is a client-only node. A client-only node can access SunIPC boards on machines that have remote access enabled.

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Installing SunIPC Software Automatically

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4

Installing SunIPC Software Automatically

This chapter explains how to install the necessary software automatically on the Sun system that physically contains the SunIPC board, the *host system.*

4.1. Overview of the Host Software Installation

Installing the software automatically involves loading the software from the distribution tape and then running the configuration program.

4.2. SunIPC Software Requirements

The SunIPC support software requires that the machine in which the SunIPC board is to be installed be running release 4.0 or later of the base Sun software. The installation procedure requires a re-configuration of the system kernel.

4.3. Other Requirements

To install SunIPC 1.2, you need 1200 Kbytes of free disk space on the file system where you are loading the software *plus* additional space, depending upon the system you are using:

Sun-2 — 510 Kbytes

Sun-3 — 510 Kbytes

Sun-4 — 610 Kbytes

If you want PC-NFS or SYSEX access, more space is required:

PC-NFS — 1515 Kbytes

SYSEX — 110 Kbytes

You must be superuser (logged in as root) to run the software installation procedures.

4.4. Loading the Software

SunIPC software is distributed on tape, the format of which is listed in Appendix D. A complete transcript of the automatic installation is shown in Appendix A.

The installation script must have permission to create the shared data directory. Also, unless you are root on your system, the SunIPC installation script will fail.

You must decide whether to read in a new shared directory from the tape, or mount an existing copy. If you want to mount an exsiting copy, mount `/usr/share/pctool` from a SunIPC fileserver, then run `/usr/share/pctool/files/ipc_configure`. If you want to read in a new shared directory, simply mount the tape and load in the software, as described in the next section.

4.5. Beginning the Installation

To load the tape's contents onto a Sun system from a local tape drive, load the tape into the tape drive and type (as superuser):

```
# usr/etc/extract_unbundled
```

When you press [RETURN], the installation will begin. The installation script will ask whether the tape drive you are using is local or remote. If the drive is remote, you will be asked the name of the machine with the tape drive. You will then be asked for the name of the tape drive.

The script will then create `/usr/share/pctool` and load the tape's contents into it. In the course of the installation, you will be asked several questions (default choices are shown on screen in parentheses):

1. Is the type of your system *standalone* or *server*?

   If your system is a server, you will be asked whether it is homogeneous or heterogeneous. If the system is heterogeneous, you will be asked which architectures you want. If you need more information on these terms, see Chapter 3.

2. Do you want to install PC-NFS software?

   See Chapter 3 for when you might want to run PC-NFS. Most SunIPC users will not require PC-NFS.

3. Do you want to install SYSEX software?

   You do if you want to run SunIPC tests from within `sysdiag` or `sun-diag`.

4. Do you want to change the destination directory?

   The default directory for the SunIPC software is `/usr/share/pctool`. If you want to specify another directory, answer **yes**. If the directory that you chose does not exist, you will be asked if you want to create it.

   When you choose to begin installation, the program begins extracting the software from the tape. Messages listing the name of each file being read from the tape and its size in bytes and blocks will display on your screen.

You will be informed when the installation process is complete, and you will be asked if you want to proceed with the configuration of your SunIPC board.

4.6. Running the `ipc_configure` Script

The configuration program automatically establishes configuration settings for the SunIPC board installed in your system. You will be asked a series of questions:

1. Do you want to change the path to the data directory which holds the SunIPC data files?

   The default data directory is `/var/pctool`. If you want to specify another directory, answer **yes**. If the directory you chose does not exist, you will be asked if you want to create it.

2. Do you want to change the path to the main directory used by `pctool`?

   The `pctool` directory is `/usr/pctool`. If you want to specify another directory, answer **yes**. If the directory you chose does not exist, you will be asked if you want to create it.

3. What are the board numbers of the SunIPC boards you want to install?

   Type **0** for the first board, **1** for the second, **ALL** for all four boards, and **NONE** to avoid having any boards configured. You may enter more than one board number number at this prompt. Separate multiple board numbers with spaces.

4. Do you want to install the server to allow remote access to your SunIPC board?

5. Do you want to install the SunIPC kernel files?

   When you specify the directory of the kernel, you will be shown your available kernel configurations.

   You will be asked to pick the name of the base kernel to use. Type one of the listed available kernels, exactly as shown. When you specify the name of the base kernel, the script will add the SunIPC kernel files and rename the new kernel by appending "`_IPC`" to the base kernel name.

The script will proceed to configure your SunIPC board. It will display status messages telling whether or not each installation step was required. Any message line that ends with "..." is a normal informational message. Except for messages that describe configuring and making your kernel, *any other message is an error.*

4.7. After Running the `ipc_configure` Script...

Once the kernel has been built, you must do the following:

1. **FIRST, BE SURE TO SAVE THE OLD KERNEL** just in case the new one does not work.
2. Next, copy the new kernel from its current location to the root directory.
3. Finally, reboot.

Copying the Kernel

To make a backup of the original kernel, type

```
# cd /
# cp /vmunix /vmunix.old
```

To move a copy of the new kernel into the old one's place, type

```
# cd /usr/share/sys/ARCH/<name of the kernel>
# cp vmunix  /
```

If You Plan to Use PC-NFS File Access...

If you plan to use PC-NFS file access with SunIPC, there are some additional tasks you need to perform. For complete instructions, see Chapter 7 of the *SunIPC 1.2 User's Guide* and the *PC-NFS User's Manual*.

Adding an Entry to the Yellow Pages Database

If there is a Yellow Pages service on your network, there must be an entry in the Yellow Pages master database for the pcserver service. The entry must appear in the file `/etc/services`. This pcserver entry makes it possible for users to gain remote access to SunIPC boards.

The SunIPC installation procedures automatically add the pcserver entry to file `/etc/rpc` on the machine in which the board is installed. If the Yellow Pages master server is *not* the machine in which the SunIPC board is installed, you must add the following line to the file `/etc/services` on the Yellow Pages master server. (With versions later than SunOS 4.0, this may be done for you.)

```
pcserver        600/tcp
```

Add the following line to file `/etc/rpc` on the Yellow Pages master server:

```
pcnfsd          150001
```

After you add this line to the file `/etc/rpc`, change your working directory to `/etc/yp` and type

```
# make
```

This command causes the network software to update any slave Yellow Pages servers in your Yellow Pages domain.

Rebooting the Host System

Now that the new kernel is in place, you can reboot the host system. To do so, type

```
# /etc/reboot
```

If all has gone well, the system will print one or more of the following messages as it boots:

```
pc0 at vme24d16 380000 vec 0xa4
pc1 at vme24d16 3a0000 vec 0xa5
pc2 at vme24d16 3c0000 vec 0xa6
pc3 at vme24d16 3e0000 vec 0xa7
```

Installation of SunIPC host software is now complete.

4.8. Running the Diagnostic Test

At this point you can execute the Diagnostic Test on the host system to verify that you have correctly installed the SunIPC board and that the board is functioning properly. Note that you must be superuser (logged in as root) or have Read and Write permissions to `/dev/vme24d16` to execute the Diagnostic Test properly.

Loopback Plug

The SunIPC parallel port can be verified only if the loopback plug is plugged into it at the back of the Sun host system's pedestal.

Running the `ipc.diag` Program

The diagnostic program resides in `/usr/pctool/etc/ipc.diag`. Enter the `ipc.diag` command from this directory to execute the Diagnostic Test. Your screen displays the following message:

```
SUN-IPC BOARD DIAGNOSTIC VERSION 1.7
```

First the system asks if the first board (`pc0`) has been installed. If you type **y** and you have *not* installed a board, an error message will tell you that `pc`*X* is not installed. If you type **n** and you *have* installed a board, the system will not run the Diagnostic Test on that board.

Each time you answer **y**, the system asks if you have installed the loopback plug on `pc`*X*. If you have not done so and answer **n**, the Diagnostic Test runs but

does not test the parallel port. If you *have* installed the loopback plug and answer **y**, the Diagnostic Test tests the parallel port.

Next the Diagnostic Test asks if the board has the floppy disk subsystem installed. If you answer **y**, the test prompts you to insert a formatted floppy disk into the drive. It then tests the floppy disk subsystem.

`ipc.diag` then tests each board for which you have answered **y**; testing takes several minutes for each board. If you want to stop the test at any time, type [CTRL-C].

When the test is complete, the system displays a report for each tested board, indicating whether it passed or failed:

```
IPC Board:  0     Passed
IPC Board:  1     Not Installed
IPC Board:  2     Not Installed
IPC Board:  3     Not Installed
```

If for any reason a board does not pass, the report indicates a failure:

```
IPC Board:  0     Passed
IPC Board:  1     Failed
IPC Board:  2     Not Installed
IPC Board:  3     Not Installed
```

Problem Checklist

If a new SunIPC board does not pass the Diagnostic Test, make sure that you have done the following:

1. Set the jumpers properly (see Section 2.3 — "Setting the Jumpers").
2. Set the VME address switches correctly (see Section 2.1 — "Setting the VME Address Switch").
3. Fitted the SunIPC board securely into its slot.
4. Plugged the loopback plug into the parallel port (see preceding section).
5. Run the test as superuser.

4.9. Overview of the Client Software Installation

There is no automatic installation for a client-only node. See the manual client installation section (5.2 — "Client Installation").

5

Installing SunIPC Software Manually

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5

Installing SunIPC Software Manually

If you have a non-standard configuration, you may need to install SunIPC manually. This chapter outlines how to do so. The instructions are written for installing all four SunIPC boards.

The first section of this chapter provides the instructions for manual installation on the host; the second section gives the steps for manual installation on a client system.

5.1. Host Installation

In case you may want to act as a server in the future, files are separated by whether or not they are architecture-specific or writable.

Definitions

Certain definitions are used in the installation process that will be different for different machines. These terms are defined below:

- *TAPE* — The tape drive that contains the release tape (for example, st0, mt0, ar0).
- *TAPEHOST* — The name of a machine that has the tape drive you will be installing from (only needed if your machine does not have a tape drive).
- *REMOTE* — The name of a machine that has a copy of the SunIPC shared data directory available.
- *BS* — The proper blocking factor for your tape. Typically this is 126 for 1/4-inch tapes, and 20 for 1/2-inch tapes.
- *ARCH* — The architecture of your node.

1. Make the SunIPC shared data directory:

```
# mkdir /usr/share/pctool
# cd /usr/share/pctool
```

Next, load the software. Perform either Step 2a or Step 2b, not both:

2a. Mount the SunIPC shared directory from a fileserver:

```
# mount REMOTE :/usr/share/pctool /usr/share/pctool
```

Also, add the following line to your /etc/fstab file:

```
REMOTE:/usr/share/pctool /usr/share/pctool nfs ro,soft,bg 0 0
```

2b. Read in the release tape. For a local tape:

```
# mt -f /dev/nrTAPE rew
# mt -f /dev/nrTAPE fsf 2
# tar xvfbp /dev/nrTAPE BS
# mt -f /dev/nrTAPE rew
```

For a remote tape:

```
# rsh TAPEHOST mt -f /dev/nrTAPE rew
# rsh TAPEHOST mt -f /dev/nrTAPE fsf 2
# rsh TAPEHOST dd if=/dev/nrTAPE ibs=BS | tar xvfpB -
# rsh TAPEHOST mt -f /dev/nrTAPE rew
```

3. Set up the main directory:

```
# mkdir /usr/pctool
# cd /usr/pctool
# ln -s /usr/share/pctool/files
# ln -s /usr/share/pctool/msdos
# ln -s /usr/share/pctool/rom_bios.pc
# ln -s /usr/share/pctool/pcfont.r.14
# ln -s /usr/share/pctool/pcfont.b.14
# ln -s /usr/share/pctool/ARCH/bin
# ln -s /usr/share/pctool/ARCH/etc
```

4. Add links to the binary directory (you could add `/usr/pctool/bin` to your search path instead):

```
# cd /usr/bin
# rm -f pctool psfx80 dos2unix unix2dos
# ln -s /usr/pctool/bin/pctool
# ln -s /usr/pctool/bin/psfx80
# ln -s /usr/pctool/bin/dos2unix
# ln -s /usr/pctool/bin/unix2dos
```

5. Set up the variable files:

```
# cd /var/pctool
# cp /usr/pctool/files/config.pc    config.pc0
# cp /usr/pctool/files/drive_C.pc   drive_C.pc0
# cp /usr/pctool/files/cmos_ram.pc  cmos_ram.pc0
# chmod 666 config.pc0 drive_C.pc0 cmos_ram.pc0
# cd /usr/pctool
# ln -s /var/pctool/config.pc0
# ln -s /var/pctool/drive_C.pc0
# ln -s /var/pctool/cmos_ram.pc0
# cd /dev ; MAKEDEV pc0
```

Repeat this once for each SunIPC board you have installed, substituting the proper board number.

6. Copy your kernel object files into your kernel directory:

```
# cp /usr/pctool/etc/pc.o        /sys/ARCH/OBJ
# cp /usr/pctool/etc/if_me.o     /sys/ARCH/OBJ
# cp /usr/pctool/etc/pc_conf.o   /sys/ARCH/OBJ
```

7. Change your kernel configuration file by adding the following lines:

```
device pc0 at vme24d16 ? csr 0x380000 priority 2
   vector pcintr 0xa4
device pc1 at vme24d16 ? csr 0x3a0000 priority 2
   vector pcintr 0xa5
device pc2 at vme24d16 ? csr 0x3c0000 priority 2
   vector pcintr 0xa6
device pc3 at vme24d16 ? csr 0x3e0000 priority 2
   vector pcintr 0xa7
```

8. Run `config` and `make` on this kernel configuration.
9. Save a copy of your old kernel, and install the new one in the root.
10. Reboot. You should see some kernel configuration lines printed when the kernel boots:

```
pcX at vme24d16 3X0000 vec 0xaX
```

11. If you want to enable remote access, turn on the pcserver. Add the server to `/etc/services` (either on your node, or if you are running the Yellow Pages, on the YP Master Server):

```
pcserver    600/tcp
```

Add this line to `/etc/inetd.conf`:

```
pcserver stream tcp nowait root
   /usr/pctool/etc/pcserver pcserver
```

If you want to run PC-NFS, obtain one host ID for each SunIPC board that will run PC-NFS. These IDs should be on the same network as the Sun that contains the board. See the *System and Network Administation Manual* for more infomation on how to do this.

Add `pcnfsd` to the `/etc/rpc` database, either on your node or on the YP Master Server, whichever is appropriate:

```
pcnfsd    150001
```

Add `pcnfsd` to your `/etc/inetd.conf` file:

```
pcnfsd/1 dgram rpc/udp wait root
   /usr/pctool/etc/rpc.pcnfsd rpc.pcnfsd
```

5.2. Client Installation

To give a client-only node access to a remote SunIPC board requires access to at least three files: `pctool`, `pcfont.b.14`, and `pcfont.r.14`. You may obtain these either by mounting the shared data directory or by copying them to your system.

Mounting a Client from a Remote Fileserver

The cleanest method is to mount the shared data directory:

```
# mkdir /usr/share/pctool /usr/pctool
# mount REMOTE:/usr/share/pctool /usr/share/pctool

# cd /usr/pctool
# ln -s /usr/share/pctool/ARCH/bin
# ln -s /usr/share/pctool/files
# ln -s /usr/share/pctool/pcfont.b.14
# ln -s /usr/share/pctool/pcfont.r.14

# ln -s /usr/pctool/bin/pctool
# ln -s /usr/pctool/bin/psfx80
# ln -s /usr/pctool/bin/dos2unix
# ln -s /usr/pctool/bin/unix2dos
```

Also, add the following line to your `/etc/fstab` file:

```
REMOTE:/usr/share/pctool /usr/share/pctool nfs
   ro,soft,bg 0 0
```

Copying Data from the Fileserver

To copy the files:

```
# mkdir /usr/pctool /usr/pctool/files

# cd /usr/bin
# rcp REMOTE:/usr/pctool/ARCH/bin/pctool .
# rcp REMOTE:/usr/pctool/ARCH/bin/psfx80 .
# rcp REMOTE:/usr/pctool/ARCH/bin/dos2unix
# rcp REMOTE:/usr/pctool/ARCH/bin/unix2dos

# cd /usr/pctool
# rcp REMOTE:/usr/share/pctool/pcfont.r.14 .
# rcp REMOTE:/usr/share/pctool/pcfont.b.14 .
# rcp REMOTE:/usr/share/pctool/files/psfx80.pro files
```

Finally, make sure that there is an entry for the SunIPC remote server on the `services` data base. See section 5.1, "Host Installation," Step 11, for more information.

6

Features of the SunIPC 1.2 Release

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6

Features of the SunIPC 1.2 Release

SunIPC 1.2 is packaged on a single tape and runs on Sun-2, Sun-3, Sun-4 systems. Sun-2 support is limited to `pctool` clients. The SunIPC board proper must be installed in a Sun-3 or Sun-4 system.

This chapter describes the new features available with the SunIPC 1.2 release. It contains the following sections:

- *System Changes* — Presents an overview of enhanced and upgraded features under SunIPC 1.2.
- *File System Organization* — Lists the files and directories included in SunIPC 1.2.
- *SunIPC 1.1 Drive C Upgrade Hints* — Describes how to access the SunIPC 1.2 logical hard drive C and still maintain access to the files stored on drive C under SunIPC 1.1.
- *Sun386i Compatibility* — Discusses the differences and similarities between SunIPC 1.2 and Sun*386i*.
- *Special Issues for SunIPC Servers* — Discusses differences between the server and client environments under SunIPC 1.2.

6.1. System Changes

SunIPC 1.2 adds support for systems being upgraded to SunOS 4.0 and permits installation of SunIPCs into Sun-4 systems. SunIPC 1.2 does not make SunIPC 1.1 obsolete; that system is retained for SunOS 3.*x* users. SunIPC 1.2 is functionally compatible with SunIPC 1.1 but contains significant enhancements, including *cut and paste* functionality and fast, efficient access to UNIX file systems through the *file redirector*.

The significant SunIPC 1.2 enhancements include the following key areas:

File Access

- The file redirector (`redir` and `extend` commands supported)
- PC-NFS 3.0

Window System Enhancements

- Faster screen access
- Cut and paste functionality
- Sun*386i* menu enhancements

MS-DOS / BASIC / BIOS

- MS-DOS upgraded from 3.1 to 3.3
- GWBASIC upgraded to 3.22
- Phoenix BIOS upgraded to 3.10V

6.2. File System Organization

SunIPC 1.2 uses a different UNIX file access method from the one used by SunIPC 1.1. The SunIPC 1.2 file system supports the file redirector (for more information, see Chapter 6 of the *SunIPC 1.2 User's Guide*). In addition, more files are stored in the Sun file system instead of in the drive C virtual disk.

The following files and directories are included in SunIPC 1.2:

Table 6-1 *SunIPC 1.2 Files and Directories*

Type	*Path*	*Description*
File	/usr/share/pctool/*ARCH*/bin/pctool	Program used to run SunIPC.
File	/usr/share/pctool/*ARCH*/bin/dos2unix	Converts an MS-DOS text file into UNIX format.
File	/usr/share/pctool/*ARCH*/bin/unix2dos	Converts a UNIX text file into MS-DOS format.
File	/usr/share/pctool/*ARCH*/bin/psfx80	A filter program (meant to be mapped into `LPT1` or `LPT3`) to convert Epson FX-80 printer codes into PostScript.
Directory	/usr/share/pctool	This is the main directory for all the SunIPC files which do not change. This directory is system-independent and is never written to. You may have a single copy of this directory tree which is shared among all SunIPC users.
Directory	/var/pctool	This directory holds all the files that need to be written to by SunIPC software. It is the only SunIPC directory which is changed regularly.
Directory	/usr/share/pctool/msdos	This directory holds all the usual MS-DOS commands, and the SunIPC commands that are runnable from within MS-DOS.
Directory	/usr/share/pctool/*ARCH*/etc	This directory holds the SunIPC support commands: `pcserver`, `pcnfsd`, `myeaddr`, `mynetmask`, `ipc.diag`, `ipc_configure`. This directory also contains `psfx80.pro`, a data file used by `psfx80`, and the kernel object files.
Directory	/usr/share/pctool/nfs	The directory for PC-NFS data files. If you are not planning to runPC-NFS, this directory will not be installed.
Directory	/usr/share/pctool/files	This directory holds the distribution image of the per-SunIPC data files, as well as other architecture-independent support files.
Directory	/usr/share/pctool/sysex	This directory contains the programs needed to run `sysdiag`.

6.3. SunIPC 1.1 Drive C Upgrade Hints

The drive C for the SunIPC 1.2 has several new utilities. It does *not* contain PC-NFS, however; instead, a single copy of PC-NFS is shared between all of the SunIPC users on the Sun's disk.

The easiest way to have access to both the new SunIPC 1.2 drive C and your old SunIPC 1.1 drive C is to mount the old drive C as `DRIVE_D`. You can do this by adding a `DRIVE_D` drive specification in your `config.pc`*X* file.

SunIPC 1.1 stored the `config.pc`*X* files in the `/ipc` directory. SunIPC 1.2 has centralized all files dealing with the SunIPC in `/usr/pctool`.

6.4. Sun*386i* Compatibility

The Sun*386i* and the SunIPC both emulate an IBM PC environment. The SunIPC is now more compatible with the Sun*386i*. In particular, the redirector and the Sun*386i* menu system have been included.

The two systems differ in the following areas:

- `pctool` and the Sun*386i* `dos` commands take different command line arguments.
- Sun*386i*'s `extend` command does not expand environment variables.
- Sun*386i* calls its configuration file `setup.pc`. SunIPC calls it `config.pc`*X*.
- Sun*386i* calls its C drive file "`C:`". SunIPC allows two virtual drives which are by default called `drive_C.pc`*X* and `drive_D.pc`*X*.
- Sun*386i* calls its cmos ram emulation file `cmos`. SunIPC calls it `cmos_ram.pc`*X*.
- Sun*386i* initializes a directory `~/pc` with its version of `drive_C.pc`*X*, `cmos_ram.pc`*X*, and `config.pc`*X* files.
- Sun*386i* provides a Virtual 8086 environment (as opposed to an 80286 for the SunIPC).
- You cannot exchange a SunIPC `DRIVE_C` with a Sun*386i* `C:`. You *can* mount a `C:` as a SunIPC `drive_D.pc`*X* (see Chapter 4 of the *SunIPC 1.2 User's Guide*). You may not use a Sun*386i* ROM image as a SunIPC `rom_bios.pc`.

6.5. Special Issues for SunIPC Servers

The server environment for SunIPC 1.2 is somewhat different from the client environment. Instead, it is similar to the SunIPC 1.1 environment. If you access the SunIPC through a server/client relationship (for example, you use the `-d` *<remote-host>:* option to access the SunIPC), you may not want to use the redirector. If you use PC-NFS, the environment will seem the same as it did in SunIPC 1.1.

The major limitations when using a server are as follows:

- File redirection happens on the server, not the client. This means that you can only access files that the server can access. Therefore, you may have to ask your system administrator to mount additional file systems.
- The `config.pc`*X*, `drive_C.pc`*X*, and `cmos_ram.pc`*X* files are all taken from the server, not from the client.
- All calls to `getenv()` to obtain the environment (for `CONFIG.PC`, `HOME`, and implicit calls when running `extend` and while processing the `config.pc`*X* file) use the environment of the server, not the client.
- SunIPC 1.2 uses the same kind of user ID scheme that `rsh` does. It attempts to map your account into a local account, using `/etc/hosts.equiv`. You may tell the SunIPC to use a specific account on the server machine by passing the `-l` argument.
- If you do not have an account, you cannot use SunIPC remotely.

6.6. Known Limitations

The following is a list of known limitations in SunIPC 1.2:

- The server does not handle adjunct password entries.
- The `pfxs80` program does not support graphics.
- Broadcasts with subnets do not work. If you are running on a subnetted network configuration, you must set your YP server and NFS daemon with the following lines in your `/usr/pctool/nfs/network.bat` file:

```
net start rdr <ipc-name>
net ypset <yp-server-name>
net pcnfsd <pcnfsd-server-name>
net subnet <subnet-mask>
```

You can make the `yp-server-name` the same as the server for your Sun workstation. To do so, run `ypwhich` to find out your current YP server. The `pcnfsd-server-name` is probably your Sun workstation's hostname if you installed the `pcnfsd` daemon.

The hostnames must be in the `/usr/pctool/nfs/hosts` file.

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Addenda

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7

Addenda

This chapter supplements documentation in the *DOS User's Manual* for the DOS commands newly supported in SunIPC 1.2. This section provides a command reference for the new MS-DOS commands.

7.1. `pemm.sys`

A special EMS memory manager for the SunIPC's board. Include the following line in the file `config.sys` to gain access to EMS memory:

```
device=pemm.sys
```

7.2. `quit`

A very important command. It allows you to exit from the SunIPC. It is especially useful when invoking a `.bat` file with the `-c` switch.

7.3. `xdir`

An enhanced `dir` command that also lists the UNIX filename. Its options are as follows:

/D - display only files that are directories

/P - page output (like `dir/p`)

/H - include hidden files

/X - show UNIX file protection

/? - list `xdir` options.

7.4. `setup`

A program that allows you to configure your `cmos_ram.pc`*X* file. Your `cmos_ram.pc`*X* file does not need to be changed for most uses.

7.5. `Flush1`

Immediately flushes buffered line printer output. `Flush1` flushes LPT1.

7.6. `Flush3`

Immediately flushes buffered line printer output. `Flush3` flushes LPT3.

7.7. `unixpath`

Normally, in MS-DOS, files are separated by the backslash character. This program makes MS-DOS pathnames resemble UNIX pathnames: separated by a slash.

7.8. `dospath`

Restores the backslash as a file separator.

7.9. `dos2unix`

Converts an MS-DOS text file into a UNIX text file by converting *carriage return/line feed* sequences into *new line* sequences.

The command format is as follows:

`dos2unix` *originalfile newfile*

You can enter this command from either a UNIX or a SunIPC DOS window. In the Sun system, the command must be in lowercase. It can only be used to convert text files, not binary or specially encoded files.

7.10. `unix2dos`

Converts a UNIX text file into an MS-DOS text file by converting *new line* sequences to *carriage return/line feed* sequences.

The format is as follows:

`unix2dos` *originalfile newfile*

You can enter this command from either a UNIX or a SunIPC window. Use only lowercase when typing this command in a Sun window. The command can only be used to convert text files, not binary or specially encoded files.

A

Installation Transcript

Installation Transcript 57

A

Installation Transcript

This appendix provides a complete transcript of the SunIPC 1.2 installation and automatic configuration.

```
skylark# extract_unbundled

Enter tape drive location [local | remote]: local

Enter Device Name (e.g. st0, mt0, ar0) : /dev/nrst0

**Please mount the release tape if you haven't done so already.**

Press return when ready:

The following product will be installed:
```

The tape identification label will be printed here

```
1+0 records in

1+0 records out

Do you want to continue [y/n]? y

/usr/etc/extract_unbundled : Extracting Install script

x /usr/tmp/unbundled/install_unbundled, 1428 bytes, 3 tape blocks
x /usr/tmp/unbundled/1.2_IPC, 23191 bytes, 46 tape blocks

/usr/etc/extract_unbundled : Begin Install Script Execution
Invoking /usr/tmp/unbundled/1.2_IPC; log file is /usr/tmp/unbundled/1.2_IPC.log

Installation should take approximately 10 minutes.

Do you want to continue [yes|no](yes)? yes

Here is the Current Free Disk space:
Filesystem            kbytes    used   avail capacity  Mounted on
/dev/sd0a               7608    4511    2336    66%    /
/dev/sd0g              54824   40361    8980    82%    /usr
/dev/sd0h             221710  178568   20971    89%    /home

This software requires up to 4465 kbytes of disk space

Do you want to continue [yes|no](yes)? yes

Enter system type [standalone | server]: standalone

You now need to decide whether or not to install the optional
software.  The optional software is:

            nfs sysex

    'nfs' is the directory that holds the PC-NFS software.
    You will need this if you want to use PC-NFS (you probably
    won't), or if you will be using IPC-clients and do not
```

```
    run the automount daemon.

    'sysex' is the directory that holds the software to run
    sysdiag/sundiag for the IPC subsystem.  You will need this
    if you want to run the IPC tests from within sysdiag or
    sundiag.  NOTE: the IPC test is not included with sysdiag
    in SUNOS version 4.0.

Do you want to install the nfs software [yes|no](no)? no

Do you want to install the sysex software [yes|no](no)? no

Currently the destination directory is /usr/share/pctool
Currently there is 8980 kbytes available
in the /usr partition (1810 kbytes required)

Currently the destination directory /usr/share/pctool
does not exist.

Do you want to change the destination directory [yes|no](no)? no

/usr/share/pctool does not exist.  Do you want to create it [yes|no](yes)? yes

Ready to install 1.2 IPC in /usr/share/pctool,

Do you want to continue [yes|no](yes)? yes
Extracting software...
x files/psfx80.pro, 9895 bytes, 20 tape blocks
x files/ipc_configure, 20888 bytes, 41 tape blocks
x files/drive_C.pc, 302080 bytes, 590 tape blocks
```

Many, many more lines of output from `tar` will be printed at this point.

```
1+0 records in
1+0 records out

The SunIPC 1.2 software is now installed into your system.
Would you like to configure the IPC software [yes|no]? yes
running /usr/share/pctool/files/ipc_configure
Using "/usr/share/pctool" as the SunIPC shared data directory...

The current cpu specific data directory is "/var/pctool".
This directory holds those data files that are unique
to your SunIPC boards.

Would you like to change this path [yes|no](no)? no

The directory "/var/pctool" does not exist.

Would you like to create "/var/pctool" [yes|no](yes)? yes
Using "/var/pctool" as the SunIPC cpu specific data directory...
```

```
The current main pctool directory is "/usr/pctool".
This directory is the top level directory used by pctool.

Would you like to change this path [yes|no](no)? no

The directory "/usr/pctool" does not exist.

Would you like to create "/usr/pctool" [yes|no](yes)? yes
Using "/usr/pctool" as the SunIPC main directory...

Enter ipc board number(s) to install [0 | 1 | 2 | 3 | ALL]: 0

Do you want to install the server to allow remote IPC access [yes|no](yes)? yes

Do you want the IPC kernel files installed [yes|no]? yes

What is the directory where your kernel lives? [/usr/share/sys] /usr/share/sys

You have the following kernel configurations available:
DL
DL110
GENERIC
SDST110
XDXT260
XYXT260

What is the name of the base kernel to add the IPC to? XYXT260

The kernel with the IPC configured in will be called XYXT260_IPC...
creating a link for /usr/pctool/files...
creating a link for /usr/pctool/msdos...
creating a link for /usr/pctool/pcfont.b.14...
creating a link for /usr/pctool/pcfont.r.14...
creating a link for /usr/pctool/rom_bios.pc...
creating a link for /usr/pctool/etc...
creating a link for /usr/pctool/bin...
creating a link for /usr/bin/pctool...
creating a link for /usr/bin/psfx80...
creating a link for /usr/bin/dos2unix...
creating a link for /usr/bin/unix2dos...
creating the file  /var/pctool/cmos_ram.pc0...
creating a link for /usr/pctool/cmos_ram.pc0...
creating the file  /var/pctool/drive_C.pc0...
creating a link for /usr/pctool/drive_C.pc0...
creating the file  /var/pctool/config.pc0...
creating a link for /usr/pctool/config.pc0...
You are in the yellow pages domain <wseng.sun.com>...

making /dev/pc0...

adding pcserver to your /etc/inetd.conf...
pcserver is already registered with your yp server...
```

```
installing your the ipc drivers into your kernel (at /usr/share/sys)...
installing if_me.o in /usr/share/sys/sun4/OBJ...
installing pc.o in /usr/share/sys/sun4/OBJ...
installing pc_conf.o in /usr/share/sys/sun4/OBJ...
making /usr/share/sys/sun4/conf/XYXT260_IPC...
running config on XYXT260_IPC (this takes a few minutes)...
Doing a "make depend"
making your kernel (this takes a few minutes too)...
cc -sparc -c -O -Dsun4 -DXYXT260 -DSUN4_260 -DCRYPT -DSYSACCT -DNFSSERVER -DNFSCLIENT
  -DUFS -DQUOTA -DINET -DKERNEL -I. -I.. -I../.. ../../netinet/in_proto.c
cc -sparc -c -O -Dsun4 -DXYXT260 -DSUN4_260 -DCRYPT -DSYSACCT -DNFSSERVER -DNFSCLIENT
  -DUFS -DQUOTA -DINET -DKERNEL -I. -I.. -I../.. ../../netinet/tcp_debug.c
```

Many more kernel compilation lines will be printed.

```
loading vmunix
rearranging symbols
text    data    bss     dec     hex
770048  104296  83304   957648  e9cd0

You should back up your original kernel (/vmunix), copy your
new kernel (/usr/share/sys/sun4/XYXT260_IPC/vmunix) to the root,
and reboot your machine

1.2_IPC : **** Installation Completed ****
skylark#
```

B

SunIPC Installation Files

SunIPC Installation Files **65**

B

SunIPC Installation Files

This appendix lists the files that are changed or added by the SunIPC installation procedure. These files are are needed for normal operation of SunIPC software, as well as for building the UNIX kernel.

IPC_Host refers to any system in which a SunIPC board has been installed.
IPC_Client refers to any system that uses a SunIPC board over the network.
YP_server refers to the master Yellow Pages server on a network.

Table B-1 *Files Needed for Normal SunIPC Operation*

File	IPC_Host	IPC_Client	YP_server
/usr/bin/pctool	added	added	-
/usr/bin/dos2unix	added	added	-
/usr/bin/dos2unix	added	added	-
/usr/bin/unix2dos	added	added	-
/usr/bin/unix2dos	added	added	-
/usr/bin/psfx80	added	added	-
/usr/pctool/files/psfx80.pro	added	added	-
/usr/pctool/pcfont.r.14	added	added	-
/usr/pctool/pcfont.b.14	added	added	-
/usr/pctool/drive_C.pc*X*	added	-	-
/usr/pctool/cmos_ram.pc*X*	added	-	-
/usr/pctool/config.pc*X*	added	-	-
/usr/pctool/rom_bios.pc	added	-	-
/etc/rc.local (PC-NFS only)	edited	-	-
/etc/services (remote access only)	edited	edited	edited (A)
/etc/hosts (PC-NFS only)	edited (A)	-	edited (A)
/etc/rpc (PC-NFS only)	edited	-	edited (A)
/etc/inetd.conf (PC-NFS or remote access)	edited	-	-
/dev/pc*X*	added	-	-

Table B-2 *Files for Building the UNIX Kernel*

File	IPC_Host	IPC_Client	YP_server
/usr/share/sys/*ARCH*/conf/GENERIC (B)	edited	-	-
/usr/share/sys/*ARCH*/OBJ/pc.o	added	-	-
/usr/share/sys/*ARCH*/OBJ/pc_conf.o	added	-	-
/usr/share/sys/*ARCH*/OBJ/if_me.o	added	-	-

(A) — Edited manually
(B) — GENERIC can be any system name

C

Using the SunIPC 1.1 PC-NFS Configuration

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C

Using the SunIPC 1.1 PC-NFS Configuration

This appendix describes the differences in the ways PC-NFS is configured under SunIPC 1.1 and SunIPC 1.2.

Differences in Network Configurations

SunIPC 1.2 does support the SunIPC 1.1 PC-NFS configuration. The SunIPC 1.1 and SunIPC 1.2 network configurations are mutually exclusive however; you can use one or the other but not both. The two methods of network configuration differ in several ways. This section explains the SunIPC 1.1 PC-NFS configuration and tells how to install a SunIPC board on your system using its conventions.

In SunIPC 1.1, the PC-NFS network is configured to use the Sun as a *gateway* to the SunIPC boards. In effect, the host Sun system acts as a bridge between the SunIPC network and the main network, thus requiring an additional network number. SunIPC 1.2 requires only an Internet address for each installed SunIPC board, not a new network number. The Internet address should be used whenever possible. The SunIPC 1.1 method should be used *only* if it is not convenient to modify the Internet Protocol addresses in the system's host databases.

Assigning the Internet Network Number

The SunIPC 1.1 scheme requires you to assign a unique Internet network number. You should request a new network number from your network administrator.

Creating a Hostname

SunIPC 1.1 hostnames should show consistency among the machine name, network name, and SunIPC board name. For example, if your Sun machine name is `joe`, the alternate name for `joe` on the SunIPC network should be `joe-host`, and each SunIPC board should be `joe-pc`*X*. This is not required by the SunIPC software, but it makes network administration and debugging easier.

Creating an Internet Network Address

You must obtain a separate network number to use for the SunIPC boards. This is a major disadvantage of the SunIPC 1.1 PC-NFS networking scheme because it is often difficult to obtain a new network number in a large system installation.

Creating Internet Host Addresses

To derive the Internet address of a SunIPC board (node), use the SunIPC Internet network number you assigned earlier. Append the host number *n*, where *n* is the SunIPC board number plus 1. For example, if your network number is **192.9.32**, then the Internet address for the SunIPC boards would be:

```
192.9.32.1   for board 0
192.9.32.2   for board 1
192.9.32.3   for board 2
192.9.32.4   for board 3
```

Recording the Hostname and Internet Addresses

The procedure for entering the hostname and Internet address in an `/etc/hosts` file depends upon whether or not there is a Yellow Pages server running on your network.

Without Yellow Pages

If you are not running the Yellow Pages, you must update the host database on the machine with the SunIPC boards. Once you have decided on the hostname and Internet address, edit the `/etc/hosts` file that resides on the Sun Workstation in which the new SunIPC board is installed. Add to this file lines that contain the new hostname and Internet address of the host system. For example:

```
192.9.32.15 joe-host
192.9.32.1  joe-pc0
192.9.32.2  joe-pc1
192.9.32.3  joe-pc2
192.9.32.4  joe-pc3
```

With Yellow Pages

If there is a Yellow Pages service on your network, edit the `/etc/hosts` file that resides on the master Yellow Pages server. For each new SunIPC board, add one line that contains a unique hostname and Internet address of the new board and an additional line that contains the second hostname and Internet address of the host system. After you edit the file `/etc/hosts`, change your working directory to `/etc/yp` and type the following:

```
# make
```

This command causes the network software to update any slave Yellow Pages servers in your Yellow Pages domain. For more information on Yellow Pages, see the *System and Network Administration* manual.

Configuring Each New SunIPC Network

Edit the `/etc/rc.local` file by adding the following line:

```
ifconfig pc0 joe-host -trailers up
ifconfig pc1 joe-host -trailers up
ifconfig pc2 joe-host -trailers up
ifconfig pc3 joe-host -trailers up
```

In the example above, `joe-host` is the new hostname assigned to the Sun system in which the SunIPC board is installed. Adding this command line allows the main network to configure correctly the new network you created.

Rebooting the Host System

Once PC-NFS is installed on SunIPC 1.2, reboot the host system in which the SunIPC board is installed. Rebooting the host system puts the changes you have made into effect.

Configuring PC-NFS

Your network environment is now ready for you to install PC-NFS. See the *PC-NFS User's Manual* for information on how to install PC-NFS on SunIPC.

D

Contents of the SunIPC 1.2 Tape

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Contents of the SunIPC 1.2 Tape

The following table lists the files and their contents on the SunIPC 1.2 distribution tape:

Table D-1 *Tape Contents*

File	*Contents*
File 1	Copyright file
File 2	1.2_IPC and install_unbundled scripts, tar format
File 3	Shared data directory (/usr/share/pctool) image, tar format
File 4	Copyright file